D–2484

Sub. Code
31511

DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, MAY 2026.

First Semester

DIGITAL COMPUTER ORGANIZATION

(CBCS 2018 – 2020 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Define Decimal Number System.

2. What is ASCII code?

3. State De Morgan's Second Theorem.

4. Define Boolean Expression with an example.

5. What is a Flip-Flop?

6. What is the function of the Program Counter (PC)?

7. Mention any two applications of stack.

8. Write any two machine1evel instructions with their format.

9. What is Associative Mapping in cache memory?

10. Define Paging in virtual memory.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Convert the following numbers into Decimal: $(1101)_2$, $(47)_8$, $(1F)_{16}$. Also, explain how to convert Decimal to Binary.

Or

(b) Perform the subtraction using 2's complement method: $(101011)_2$ -$(11001)_2$. Show all steps.

12. (a) Prove the Boolean identity: A + AB = A. Use truth table and Boolean laws.

Or

(b) Simplify the expression F = A'B' + A'B + AB using Boolean algebra and explain each step

13. (a) Explain the functions of Accumulator, Instruction Register, and Memory Address Register.

Or

(b) Illuminate the Fetch Cycle in detail with a neat flow diagram.

14. (a) Illustrate the PUSH and POP operations in stack with example and memory flow

Or

(b) Write short notes on any three addressing modes with suitable examples.

15. (a) Explicate different levels of memory hierarchy and their performance trade-offs.

Or

(b) Describe segmentation and its role in memory management.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Illustrate the conversion of binary numbers into octal and hexadecimal with appropriate grouping method and examples.

17. Simplify the Boolean function F(A, B, C, D) = $\sum$ (1, 3,5,7,9, 11, 13, 15) using K-map. Show all grouping steps and derive the minimal expression.

18. Explain in detail the micro-operations involved in the execution of an instruction with timing diagrams.

19. Design a stack-based expression evaluation system using memory and explain its working in detail.

20. Discuss the differences between virtual memory and cache memory. Highlight their hardware requirements and practical applications in computing systems.

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D–2485	Sub. Code
	31512

DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, MAY 2026.

First Semester

OBJECT ORIENTED PROGRAMMING AND C++

(CBCS 2018 – 2020 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

SECTION A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

1. What is encapsulation in Object Oriented Programming?

2. Mention any two predefined console stream classes.

3. Define a constructor.

4. What is the use of this pointer?

5. Define multilevel inheritance with a simple example.

6. What is operator overloading?

7. Write the syntax of a function template.

8. What are file pointers?

9. What is an exception?

10. Write two situations where exception handling is necessary.

SECTION B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b).

11. (a) Explain the features of Object Oriented Programming.

Or

(b) Describe formatted and unformatted I/O operations in C++.

12. (a) Explain the concept of friend functions with examples.

Or

(b) Write a C++ program to demonstrate the function overloading.

13. (a) Explain various forms of inheritance.

Or

(b) Write a C++ program to overload the operator binary '+'.

14. (a) What are class templates? Illustrate with example.

Or

(b) Write a program to demonstrate file operations using fstream.

15. (a) Explain exception handling mechanism in C++ with try-catch example.

Or

(b) Discuss exception handling in constructors and destructors.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain the evolution of Object-Oriented Languages and their advantages over procedural languages.

17. Illustrate the different types of constructors with an example.

18. Describe multiple inheritance and how ambiguity is resolved using scope resolution operator.

19. Explain function templates and class templates with suitable examples.

20. Write a C++ program to demonstrate the array out of bounds exception.

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	31513

DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, MAY 2026.

First Semester

DATA STRUCTURE AND ALGORITHMS

(CBCS 2018 – 2020 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. What is called data Structure?

2. Define Array.

3. What is Stack?

4. Differentiate input and output restricted deque.

5. What do you mean by traversing binary trees?

6. Define hash function.

7. What is searching?

8. Write the complexity of linear and Fibonacci search.

9. List the two types of sorting.

10. What is tree sort?

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Summarize the concept of linear data structure.

Or

(b) How to represent the memory of a Single-dimensional array? Explain.

12. (a) Write an algorithm for infix to postfix conversion.

Or

(b) Describe the concept of priority queue.

13. (a) How to traversing a binary tree? Explain.

Or

(b) Discuss about Quadratic probing in detail.

14. (a) Write a program to perform linear search with neat explanation.

Or

(b) Describe about interpolation search.

15. (a) Write a short note on bucket sort.

Or

(b) Write an algorithm for selection sort.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Write a detailed note on Techniques of Algorithm Design.

17. Discuss about insertion and deletion in doubly-linked lists.

18. Explain Binary tree representations with neat diagram.

19. Write a detailed comparison of different search algorithms.

20. Describe about quick sort algorithm with example.

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D–2487	Sub. Code
	31522

DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, MAY 2026.

Second Semester

RELATIONAL DATABASE MANAGEMENT SYSTEMS (RDBMS)

(CBCS 2018 – 2020 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. What is a database system?

2. Differentiate between DDL and DML.

3. Differentiate between weak and strong entities.

4. Define Dab Abstraction.

5. What are functional dependencies in DBMS?

6. What is a correlated subquery?

7. What are the ACID properties in a transaction?

8. What is a deadlock in a database system?

9. What is indexing, and why is it needed?

10. What is the difference between a clustered and a non-clustered index?

SECTION B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b).

11. (a) Discuss the key differences between file systems and database management systems.

Or

(b) Describe the concept of ER modeling and its importance in database design.

12. (a) Describe the different types of joins in SQL with examples.

Or

(b) Define View. Discuss on Materialized view.

13. (a) Explain the various types of normalization with examples.

Or

(b) What is Sub Query? Explain its types.

14. (a) What is the role of transaction management in databases?

Or

(b) Explain transaction management and concurrency control techniques.

15. (a) Describe the different types of indexing techniques and their applications.

Or

(b) Compare and contrast different storage structures used in RDBMS.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain the various data models used in database management systems with suitable examples.

17. Discuss Relational Algebra with example.

18. Write the Steps to Normalize an Organization Database Design.

19. What is Protocol? Discuss Lock based Protocols and Timestamp Based Protocols.

20. Why Performance Tuning is important for database? Explain.

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	31523

DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, MAY 2026.

Second Semester

COMPUTER GRAPHICS

(CBCS 2018/2020 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define raster scan and random scan displays.

2. What is output primitive?

3. What is homogeneous coordinate?

4. Mention any two uses of viewing transformation.

5. What is the role of control points in Bezier curves?

6. State any two illumination models.

7. What is shearing in 3D transformation?

8. State composite transformation.

9. Define back-face detection.

10. What is keyframe animation?

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Explain Bresenham's line drawing algorithm 'with example.

Or

(b) Discuss the midpoint circle drawing algorithm.

12. (a) Explain 2D rotation with matrix representation.

Or

(b) Derive the composite transformation matrix for scaling and translation.

13. (a) Explain Hermite and Bezier curves with equations.

Or

(b) Discuss basic illumination models used in computer graphics.

14. (a) Explain Cyrus-Beck line clipping algorithm.

Or

(b) Compare Cohen-Sutherland and Sutherland-Hodgenan algorithms.

15. (a) Explain scan-line and depth buffer methods.

Or

(b) What are keyframe systems? Explain their role in animation.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain raster-scan system architecture with diagram.

17. Describe 2D geometric transformations: translation, scaling, rotation, and reflection.

18. Write short notes on polygon surfaces, B-spline curves, and polygon rendering methods.

19. Explain 3D viewing pipeline and coordinate transformations in detail with diagrams.

20. Describe the design and working of computer animation sequences.

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D–2489

Sub. Code
31532/34032

DISTANCE EDUCATION

M.C.A./M.C.A. (Lateral Entry) DEGREE EXAMINATION, MAY 2026.

Third Semester

OPERATING SYSTEM

(CBCS 2018 – 2020 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define an operating system.

2. List any four types of system calls.

3. What is a process?

4. Define context switching.

5. What is a critical section?

6. State any two necessary conditions for deadlock.

7. Define paging.

8. What is demand paging?

9. What is a file?

10. Define disk scheduling.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Explain the various operating system services.

Or

(b) Describe the layered and microkernel system structures.

12. (a) Explicate process state and state transition diagram.

Or

(b) Discuss scheduling criteria and types of CPU schedulers.

13. (a) Illustrate the critical section problem and give a software solution.

Or

(b) Give a brief note on Semaphore.

14. (a) Illuminate contiguous and non-contiguous memory allocation schemes.

Or

(b) Elaborate the concept of virtual memory and paging.

15. (a) List and explain the different file access methods with examples.

Or

(b) Narrate the disk structure and disk attachment methods.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain the major functions of operating systems and the system call mechanism.

17. Describe process synchronization using semaphores and monitors.

18. Explain in detail deadlock prevention, avoidance, detection, and recovery methods.

19. Elaborate the various memory management strategies in detail with examples.

20. Discuss file system implementation and directory structures in detail.

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